Korea: Radio Frequency Identification (RFID) Technology

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Summary

The basic components comprising Radio Frequency Identification (RFID) have existed for several decades. Until recently, however, the cost and the limited scope of available RFID systems have made the technology an impractical choice for commercial applications. In many countries including Korea, RFID has already established itself as a reliable solution for tracking livestock, public transportation fare payment, highway toll collection, and postal services. Currently as RFID use is expanding in Korea, more advanced technologies are in higher demand by the market. RFID is believed to have the potential to revolutionize a wide variety of industries, especially on the supply side, and eventually to become part of a seamless and ubiquitous communication lifestyle. Areas like retail, manufacturing, logistics, inventory management, and shipment tracking stand ready to reap billions of dollars in savings if cost-effective RFID solutions can be developed. The Korean government is investing heavily to help develop the technology and the market for RFID.

Market Demand

According to the Korean Ministry of Information and Communication's (MIC) funded research institute, Electronic Technology Research Institute (ETRI), and the Korea RFID/USN (Radio Frequency Identification/Ubiquitous Sensory Network) Association, Korea's RFID market demand was valued at US$260 million in 2005, which was a 62 percent increase from that of 2004. Demand is forecast to reach almost US$400 million by the end of 2006, and expected to grow at an average annual rate of 50 percent over the next three years. The amount of export was valued at US$26 million in 2005, and it is expected to reach US$50 million in 2006, which would account for nearly 100 percent growth. Although ETRI forecasts that the amount of foreign imports into Korea will decrease in terms of percentage due to Korean companies' production plans, the market demand for new technologies and services will continue to bring in more imports from the U.S.

Since 2004, a new growth engine, the RFID initiative, is being driven by the Korean government, including MIC, the Ministry of Commerce, Industry and Energy (MOCIE), the Ministry of Science and Technology (MOST), and the Ministry of Construction and Transportation (MOCT). This initiative is expected to boost demand in new RFID technology applications from 2006 over the next several years.

In order to enhance global competitiveness and become a leader in the IT market, MIC has declared RFID an important technology of the future and plans to aggressively pursue its development, along with a host of other new converging technologies. RFID applications are already being adopted and used in Korea, in the areas of asset management, transportation ticketing, cargo and airline baggage tagging, etc. MIC is now concentrating on pilot projects of RFID/USN and mobile RFID technologies. MIC plans to spend US$400 million to develop and commercialize complete core technology and to create a USN for RFID by 2010. Korea's ultimate goal is to control seven percent of the global RFID market by 2010 and to become the world's leading exporter of RFID technology by 2010.

The Korean government plans to build public infrastructure using RFID, through the establishment of RFID readers on roads, harbors, and airports. The government forecasts that approximately US$4.8 billion worth of RFID production will save as much as US$1.8 billion in 2006-2010. In order to foster core technologies development, which are dependent on imports today, MIC is supporting digital convergence and ubiquitous technologies through the continuous promotion of RFID and the establishment of ubiquitous-Information Technology (u-IT) clusters.

RFID pilot projects led by the Korean government are expected to turn into projects from 2006. MIC has set aside an early stage financing budget of approximately US$15 million for agencies that submit specific business plans

on RFID applications among agencies that have been involved in pilot projects in 2004-2005. The demand for RFID equipment and solutions for new projects is forecast to increase by more than ten times that of pilot projects. In addition to main government RFID projects, Mobile RFID businesses with various applications, in which RFID and mobile/wireless technologies are combined, will also prompt strong interests and demand from the market as a new pilot project.

The Korean Song-do u-IT cluster located in the Incheon area is attracting multinational companies' Research and Development (R&D) centers for new RFID/USN equipment and solutions by developing a u-IT city in Songdo, for which the Korean government plans to budget US$37.1 million. In Song-do, a u-IT cluster, USN fabrication, pilot packaging, manufacturing facilities as well as test centers will be in conjunction with completion of the city's public infrastructure which is expected to be completed by early 2008.

The Ministry of Agriculture and Forestry also plans to build Supply Chain Management (SCM) in 2006, which will be applied to livestock according to RFID tag price variance.

The following s are the Korean Ministry of Information and Communication (MIC) Market Projections/ Objectives:

- Over 100 million contactless smart cards to be issued over 2005-2007
- Control 5% of the global RFID market by 2007
- World leader in RFID technology by 2010
- Producer of the smallest and cheapest RFID by 2007
- Core technology development by 2006
- Ubiquitous Sensor Network establishment by 2010

Market Data

Korean RFID Project Revenues 2003-2005

		Total	Tag	Reader	Antenna	S/W	SI	Others
2003	Sales Rev	54,905	7,375	15,963	2,394	1,028	20,021	8,124
	Sales rate	100.0	13.4	29.1	4.4	1.9	36.5	14.8
	No of firms	52	25	31	11	13	17	11
2004	Sales Rev	163,037	32,007	34,446	12,395	4,903	65,513	13,773
	Sales rate	100.0	19.6	21.1	7.6	3.0	40.2	8.4
	No of firms	72	40	42	18	25	26	17
2005	Sales Rev	262,139	56,193	56,331	24,695	14,763	86,355	23,802
	Sales rate	100.0	21.4	21.5	9.4	5.6	32.9	9.1
	No of firms	74	36	45	19	33	30	20

(Unit: USD 1,000, %)/ Source: ETRI)

Korean RFID Exports to the Rest of the World 2003-2005

		Total	Tag	Reader	Antenna	S/W	SI	Others
2003	Sales Rev	7,582	542	700	200	-	100	6,040
	Sales rate	100.0	7.1	9.2	2.6	-	1.3	79.7
	No of firms	8	3	4	1	-	1.3	79.7
2004	Sales Rev	21,220	605	10,459	48	179	269	9,660
	Sales rate	100.0	2.9	49.3	0.2	0.8	1.3	45.5
	No of firms	14	6	8	1	3	2	3
2005	Sales Rev	25,603	8,036	12,558	1,225	1,175	1,149	1,460
	Sales rate	100.0	31.4	49.0	4.8	4.6	4.5	5.7
	No of firms	18	10	11	5	5	6	6

(Unit: USD 1,000, %)/ Source: ETRI)

Korean RFID Imports from Abroad 2003-2005

		Total	Tag	Reader	Antenna	S/W	SI	Others
2003	Imports Rev	7,882	3,185	3,408	39	200	900	150
	Import rate	100.0	40.4	43.2	0.5	2.5	11.4	1.9
	No of firms	19	13	9	2	1	1	2
2004	Imports Rev	10,758	5,460	4,160	373	460	-	305
	Import rate	100.0	50.8	38.7	3.5	4.3	-	2.8
	No of firms	29	23	17	7	4	-	3
2005	Imports Rev	26,404	13,801	9,000	1,184	1,702	-	717
	Import rate	100.0	52.3	34.1	4.5	6.4	-	2.7
	No of firms	34	26	18	8	6	-	6

(Unit: USD 1,000, %)/ Source: ETRI)

Forecast for global sales of RFID tags in billions 2005-2015

Number (billions)	2005	2010	2015
Individual Products	0.5	27.0	1,000.0
Pallet/case	0.4	30.0	35.0
Other	0.4	5.7	12.5
All categories total	1.5	62.7	1,047.5

Best Prospects

The Korean government is aggressively pursuing the development of RFID with the ultimate goal of establishing Korea as the global leader, exporter, and producer of RFID technology by 2010. MIC plans to develop core technologies and infrastructure for passive and active RFID in 2006, launch sensing-type RFID by 2007, and create a complete ubiquitous RFID sensor network by 2010. Since the primary objective of the Korean government's RFID policy is to foster domestic production and exporting capabilities, there will be significant government investment and support for local RFID firms.

MIC also forecasts development of new devices and related services, including ID tags, tag readers, middleware software and solutions, location-based services and other applications to commercialize RFID technology. This sector will generate USD$3.5 billion in production by 2007. RFID pilot projects conducted by the Korean government, including MIC and the Ministry of Commerce, Industry and Energy (MOCIE), are expected to have a large ripple effect across industries and create an even higher demand for RFID as new applications and uses are discovered.

MIC funded US$30 million in 2005 to develop core technologies, run pilot projects, and test bed labs. MIC is expected to spend US$141 million to develop and commercialize core technologies and to create a Ubiquitous Sensor Network for RFID technology by 2010. US$71 million will be allocated for research and development and US$55 million will be reserved for pilot projects. MOCIE is taking the lead in the development of RFID systems in

Supply Chain Management (SCM) and distribution, while MIC will focus on advanced technology development for RFID/USN deployment, excluding SCM and distribution.

According to a recent survey, the best prospects in RFID application services came from logistics and distribution sectors, at 57.1 percent, followed by security and transportation with 9.8 percent and 6.1 percent respectively, as of 2005. RFID/USN market opportunities for U.S. exporters should come from network development and equipment/service-related applications, as well as software solutions. The key growth of RFID market demand tends to depend on the development of tag technology. When chipless technology is introduced in 2007 and a tag price becomes less than five cents, the RFID market demand for RFID technology is expected to explode. Korean RFID companies are trying to find advanced technology companies to partner co-developing core technology and standards to overcome fierce competition and to become a leader in the global market.

When RFID systems begin their introduction on a full scale, the establishment of the infrastructure that controls collected data from tags will be a key focus, and the relevant software market will rapidly grow in 2006-2008. Embedded software and middleware will be in high demand to support the development of a full scale RFID/USN system software consisting of middleware and application management, databases, and networking solutions.

A combination of RFID/USN and mobile communication, mobile RFID (mRFID) is under development and is a new trend in RFID services in Korea. mRFID technology is expected to allow RFID/USN technology to be used on a cellular and wireless internet infrastructure for ubiquitous access to users.

Key Suppliers

The Korean government has also expressed interest in working co-operatively with other regional foreign governments to foster the development of RFID. The Korean government is looking for offshore investment in R&D. MIC's RFID development plan encourages private Korean companies to invest in RFID technology and to strengthen cost competitiveness. Korea, China, and Japan recently formed an international work group for the purpose of sharing advancements in Information Technology and with the goal of creating and experimenting with an interoperable regional RFID network. The group is charged with cooperatively developing next-generation Internet solutions, with a particular focus on RFID and Internet protocol.

Competition in Korea's IT market is extremely fierce and only firms that can provide affordable solutions and up-to-date technology achieve success. Currently, major local players for developing RFID technology are Samsung, LG, and Hyundai, which are the large conglomerate electronics companies in Korea. US technology players are already setting up RFID R&D centers in Seoul, and several Korean firms, including LG, Hyundai, and Samsung have plans to collaborate with U.S. firms on RFID development. There will be considerable Korean market opportunities for U.S. suppliers of RFID equipment and solutions, particularly during 2006. Given the enormous growth potential of the global RFID market, and the substantial savings and additional revenue for retailers and supply side firms, Korea's relative lack of technology expertise creates strong opportunities for US firms to enter the market. The Korean government is looking for offshore investment in R&D. MIC's RFID development plan encourages private Korean companies to invest in RFID technology and to strengthen their cost competitiveness.

Prospective Buyers

The primary end uses of RFID technology are in retail, manufacturing, distribution, public transportation systems, and livestock sectors. In civil industry, retail stores can use RFID to manage product inventory and automatically re-order supplies of dwindling products. The technology can also be used to replace the barcode scanning in the final purchase process of products by customers. Manufacturing and distribution processes benefit from RFID's ability to control items on assembly lines and to track and identify shipments. Public mass transportation systems can utilize RFID as a fast and convenient way for passengers to pay fares or to track and maintain effective use of rail cars. RFID can be used in the livestock industry to locate and control animals and their final products.

In the government sector, MIC funds many pilot programs of RFID technology in product control systems, military ammunition systems, national export & import logistics systems, imported beef tracking systems, aviation baggage trace control, and effective harbor distribution. The government plans to introduce and fund the pilot RFID programs to the central government, provincial governments, and public organizations.

The distribution industry is developing pilot projects to introduce RFID by the end of 2006 and is led by local companies including Lotte shopping and E-mart. In the area of manufacturing, automobile companies such as Hyundai, Ssangyong, and Kia plan to apply RFID to the manufacturing process, as well as to tire pressure monitoring systems. In the healthcare industry, Samsung hospital and Bundang Seoul National University Hospital are developing business models.

The technology is relatively new and still under development, but there are many potential applications and users for RFID, and new user markets are expected to arise as the technology progresses. Many analysts expect RFID to revolutionize the supply side of the economy in numerous industries. The uses for RFID are limited only by the imagination and the advent of MIC pilot programs that are expected to define new applications and end users within Korea as they generate a ripple effect throughout other industries.

Market Entry

Local representation is essential for the success of foreign firms in the Korean market. This is especially true when considering the fact that business relationships in Korea are built upon personal ties and social introductions, and that much of the major third-country competition is only a few flight-hours away. In addition, for sectors that involve any type of government procurement, an entity must be registered with the Korean government in order to bid on the procurement projects. Hence, many American firms enter into a consortium with a Korean company or enter into a representative agreement, especially for the purposes of market entry. Finally, the language barrier and established social/ business circles make it extremely difficult to enter the Korean market without a qualified Korean representative.

Market Issues & Obstacles

Most IT and Telecom equipment enters Korea at a zero percent duty in accordance with the International Technology Agreement (ITA) under the auspices of the World Trade Organization (WTO). Wireless equipment switches, base stations, transmission, and repeaters are included under HS code 8525 and can be adopted as RFID infrastructure.

At present, all telecommunications-related equipment is subject to type registration/approval and Electromagnetic Compatibility (EMC) testing. Both type approval and EMC tests are conducted at the Radio Research Laboratory (RRL) under the auspices of the MIC. The procedures to be followed in obtaining RRL's certification are extremely complex, making approval very difficult, if not impossible, without the assistance of a locally based Korean representative. For this reason, many U.S. suppliers have found it advantageous to have their Korean agents/distributors or importers engage the services of one of the 30 companies licensed in Korea as RRL testing agents to handle the entire test process on behalf of the U.S. suppliers. Korea does not accept test data from American laboratories or manufacturers; testing reports from independent laboratories are considered supportive of the application, but not a substitute for official certification in Korea. U.S. companies can obtain complete information, including the lists of items subject to type registration, type approval, and EMC testing, and certification fees through the following Radio Research Laboratory (RRL) web site: http://approval.rrl.go.kr/eng/index.html.

The Korean government encourages the Korean industry to develop Korean IT/telecom standards through the Telecommunications Technology Association (TTA) and through the Electronics and Telecommunications Research Institute (ETRI). U.S. suppliers of leading equipment and solutions for advanced RFID services who are

exploring the Korean market are encouraged to consult with CS Korea and to consider carefully the possible limitations to market access that the development of Korean standards may pose.

There has been a growing awareness in Korea of the importance of the protection of intellectual property rights for both domestic and foreign providers of software and technologies, and the Korean government has taken more steps to enforce IPR than in the past. Nonetheless, U.S. suppliers of IT/telecom products and technologies should make sure that their IP is adequately protected prior to entering the market and should consider carefully different ways to avoid possible infringement.

Trade Events

One of the most effective sales promotion strategies for U.S. firms is to present technology, applications, and cost/performance to prospective Korean customers. Trade shows are ideal opportunities for U.S. suppliers to demonstrate the superiority of their products/services to Korean consumers and thereby enter domestic distribution channels. The following annual trade shows are effective vehicles for the promotion of RFID related products and services:

EXPO COMM WIRELESS KOREA 2006
Dates of Exhibition: May 10 ~ May 13, 2006
Organizer: COEX/ K. Fairs Ltd
Contact: Phone: +82-2-6000-1078, +82-2-557-6776
www.expocomm.co.kr

Sek 2006, The 20th Solution & Contents Exhibition of Korea
Dates of Exhibition: June 21 ~ June 24, 2006
Organizer: The Electronic Times
Contact: Phone: +82-2-2168-9335
www.sek.co.kr

The 6th CardTech Korea & RFID World 2006
Dates of Exhibition: July 12 ~ July 14, 2006
Organizer: NCTRO
Contact: Phone: +82-2-3273-3138
www.cardtechkorea.com

RFID/USN KOREA 2006
Dates of Exhibition: August 30 ~ September 1, 2006
Organizer: K. Fairs Ltd.
Contact: Phone: +82-2-555-7153
www.rfidkorea.or.kr

IT EXPO BUSAN 2006
Dates of Exhibition: September 14 ~ September 17, 2006
Organizer: BEXCO
Contact: Phone: +82-51-740-7390
www.itexpo.or.kr

Resources & Key Contacts

The Korean Ministry of Information and Communication (MIC): www.mic.go.kr
The Korean Ministry of Commerce, Industry and Energy (MOCIE): www.mocie.go.kr/
The Korean Ministry of Science and Technology (MOST): www.most.go.kr
The Korean Ministry of Construction and Transportation (MOCT): www.moct.go.kr

For More Information

The U.S. Commercial Service in Seoul, Korea is the Commercial Section of the U.S. Embassy in Seoul, Korea and can be contacted via e-mail at: Chris.Ahn@mail.doc.gov Phone:82-2-397-4186 Fax: 82-2-737-5357 or visit our website: http://www.buyusa.gov/korea/en.

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